GRS Gabriel Roeder Smith & Company
Consultants & Actuaries

CITY OF GRAND RAPIDS GENERAL RETIREMENT SYSTEM

5-YEAR EXPERIENCE STUDY

JULY 1, 2009 THROUGH JUNE 30, 2014

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October 8, 2015

The Board of Trustees
City of Grand Rapids General Retirement System
Grand Rapids, Michigan

Dear Board Members:

Presented in this report are the results of an ***actuarial investigation of experience*** of the City of Grand Rapids General Retirement System. The investigation was conducted for the purpose of updating the actuarial assumptions used in computing Retirement System actuarial liabilities and establishing employer contribution rates.

The investigation was based upon the statistical data furnished for annual active member and retired life actuarial valuations during the period ***July 1, 2009 to June 30, 2014.***

We believe that the actuarial assumptions recommended in this report represent individually reasonable estimates of future experience of the City of Grand Rapids General Retirement System.

James D. Anderson is a Member of the American Academy of Actuaries (MAAA), and meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Respectfully submitted,

James D. Anderson, FSA, EA, MAAA

David L. Hoffman

JDA/DLH:sc

OVERVIEW

EXPERIENCE STUDY
INTRODUCTION

Each year as of June 30, the actuarial liabilities of the System are valued. In order to perform the valuation, assumptions must be made regarding the future experience of the System with regard to the following risk areas:

- Rates of **withdrawal** of active members.
- Rates of **disability** among active members.
- Patterns of **salary increases** to active members.
- Rates of **retirement** among active members.
- Rates of **mortality** among active members, retirants, and beneficiaries.
- Long-term rates of **investment return** to be generated by the assets of the System.

Assumptions should be carefully chosen and continually monitored. An unrealistic set of assumptions can lead to:

- Understated costs resulting in either an inability to pay benefits when due, or sharp increases in required contributions at some point in the future; and

- Overstated costs resulting in either benefit levels that are kept below the level that could be supported by the computed rate, or an unnecessarily large burden on the current generation of members, employers and taxpayers.

A single set of assumptions will not be suitable indefinitely. Things change, and our understanding of things (whether or not they are changing) also changes. The package of assumptions is then adjusted to reflect basic experience trends -- but not random year to year fluctuations.

No single experience period should be given full credibility in the setting of actuarial valuation assumptions. When we see significant differences between what is expected from our assumptions and actual experience, our strategy in recommending a change in assumptions is usually to select rates that would produce results somewhere between the actual and expected experience. In this way, with each experience study the actuarial assumptions become better and better representations of actual experience. Temporary conditions that might influence a particular experience study period will not unduly influence the choice of long-term assumptions.

We are recommending certain changes in assumptions. The various assumption changes and their impact on the required contribution are described on the following pages.

Withdrawal experiences were higher than previously assumed for males and females. We recommend increasing the withdrawal rates for both males and females. This change causes a decrease in the computed contribution rate.

Service based withdrawals (those occurring before five years of service) were higher than assumed. We recommend an increase in these rates. This change causes a decrease in the computed rate.

Retirement experience indicated more retirements than assumed. We recommend an increase in this assumption. This change causes an increase in the computed contribution rate.

Disability experience was exactly as previously assumed. We are recommending no change in this assumption.

Pay increase rates (merit and seniority portion) have been lower, on average, than assumed over a decade. However, after adjusting for actual price inflation, we see little difference between observations and expectations. We are recommending no change in this assumption.

Retired Life Mortality. Based on the size of the population, we believe little credibility can be assigned to observations of mortality experience. Instead, we recommend a change to the RP-2014 Healthy Annuitant Mortality Table projected to 2019 using the MP-2014 mortality improvement scale. The new mortality rates produce life expectancies that are longer for males. In addition, we also recommend changing the mortality assumption for disabled lives to the RP-2014 Disabled Retirees projected to 2019 using the MP-2014 mortality improvement scale. These disabled mortality rates result in longer life expectancies for males.

Death-in-Service Mortality Rates. The recommended assumption is the RP-2014 Mortality Tables for Employees projected to 2019 using the MP-2014 mortality improvement scale.

2009-2014 EXPERIENCE STUDY
SUMMARY OF DEMOGRAPHIC EXPERIENCE
(CONCLUDED)

Load for Service Purchases. We received data from Retirement System staff containing current reported service purchase balances in the amount of $2.6 million for active members. We have established the liability for service purchases to be approximately $5.0 million – based on applying valuation interest to the initial contributions reported. This method replaces the previous method which loaded normal cost by 0.50% of payroll.

Load for 13th Check. We have tested the market rate measure of returns both historically (against actual experience) and on a forward-looking basis (via a stochastic model). We expect that the returns on assets for the 13th check group will be reduced by 50 to 100 basis points going forward. To reflect this anticipation we placed a 5.0% load on affected liabilities.

The combined effect of the proposed demographic assumption changes is shown on page 7. The result of our proposed changes is an increase of the employer contribution rate. This result is consistent with the demographic experience losses that occurred during the observation period.

Additional detail concerning the demographic experience is shown on pages 8 to 14. An expanded listing of recommended demographic assumptions is shown beginning on page 15.

We believe that the changes in mortality rates and the investment return assumption are to be applied to optional retirement benefit factors. The board should establish an effective date for this purpose.

ECONOMIC ASSUMPTIONS

ECONOMIC ASSUMPTIONS

Economic assumptions include long-term rates of investment return and wage inflation (the across-the-board portion of salary increases). Unlike demographic activities, economic activities do not lend themselves to analysis solely on the basis of internal historical patterns because both salary increases and investment return are more affected by external forces; namely inflation, general productivity changes and changes in financial markets. Estimates of economic activities are generally selected on the basis of the expectations in an inflation-free environment and then both are increased by some provision for long-term inflation.

If inflation and/or productivity increases are higher than expected, actual rates of salary increase and investment return are likely to exceed the assumed rates. Salaries increasing faster than expected produce unexpected liabilities. Investment return exceeding the assumed rates (whether due to manager performance, change in the mix of assets, or general inflation) results in unanticipated assets. To the extent that inflation, productivity, and other factors have about the same effect on both sides of the balance sheet, these additional assets and liabilities can offset one another over the long-term.

Current and proposed (Alternate) economic assumptions for the System are as follows:

	Current	**Alternate 1**	**Alternate 2**
Price Inflation	2.75%	2.75%	2.75%
Wage Inflation	3.50	3.50	3.50
Investment Return	7.50	7.25	6.50
Spread	4.00	3.75	3.00

The basis for these proposed assumptions follows.

Wage Inflation and Price Inflation (from the 2014 Trustees Report OASDI). For the 2014 Trustees Report, over the 65-year period from 2023 to 2088, the Trustees set the average annual growth rate in the OASDI covered wage to 5.2 percent, 3.8 percent, and 2.5 percent for alternatives I, II and III, respectively. Also for the 2014 Trustees Report, the Trustees set the assumed ultimate annual rates of increase in the SPI-W (Price Inflation) to 3.4 percent, 2.7 percent and 2.0 percent for alternatives I, II and III, respectively. Thus, for the 2014 Trustees Report, the Trustees set the average real wage differential, over the 65-year period from 2023 to 2088, to 1.8 percent (5.2 less 3.4), 1.1 percent (3.8 less 2.7), and 0.5 percent (2.5 less 2.0) for alternatives I, II and III, respectively. These average real wage differentials for alternatives I, II and III are approximately equal to those used in the 2013 Trustees Report.

The long-term intermediate assumption (alternative II) used in the 2014 Social Security report is 2.7%. The proposed alternate economic assumptions used in this report reflect this price inflation assumption.

Investment Return. The allocation of assets within the universe of investment options will significantly impact the overall performance. Therefore, it is meaningful to identify the range of expected returns based on the System's targeted allocation of investments and an overall set of capital market assumptions.

Current Allocation	
Class	**Weight**
US Stocks	22.50%
Global Stocks	22.50%
Private Markets	5.00%
Core Bonds	12.50%
LTCore Bonds	12.50%
TIPS	10.00%
US RE Securities	5.00%
Commodities	5.00%
MLP	5.00%
Inflation	100.00%

The expected rate of return on investments is selected by the Board based upon information provided by the actuary and investment consultants. The assumption is developed using the building block approach beginning with an assumed rate of inflation plus the real return assumption. The real rate of return is estimated based on the simplified target asset allocation mentioned above. We used capital market expectations for various asset classes provided by eight nationally recognized investment consultants. The development of the average nominal return (using a price inflation assumption of 2.75% and an expense assumption of 25 basis points), net of investment and administrative expenses, is provided in the following tables.

	Total		Real			Total	Weighted Total
Class	**Return %**	**Risk %**	**Geometric %**	**Arithmetic %**	**Weight**	**Arithmetic %**	**Arithmetic %**
US Stocks	6.50%	17.00%	4.55%	6.00%	22.50%	8.75%	1.97%
Global Stocks	6.70%	17.15%	4.75%	6.22%	22.50%	8.97%	2.02%
Private Markets	9.15%	27.50%	7.20%	10.98%	5.00%	13.73%	0.69%
Core Bonds	3.60%	5.00%	1.65%	1.78%	12.50%	4.53%	0.57%
LTCore Bonds	4.05%	10.00%	2.10%	2.60%	12.50%	5.35%	0.67%
TIPS	3.15%	6.00%	1.20%	1.38%	10.00%	4.13%	0.41%
US RE Securities	5.55%	15.50%	3.60%	4.80%	5.00%	7.55%	0.38%
Commodities	3.95%	15.00%	2.00%	3.13%	5.00%	5.88%	0.29%
MLP	9.45%	17.00%	7.50%	8.95%	5.00%	11.70%	0.59%
Inflation	**1.95%**				**100.00%**		**7.59%**

The first table above shows the expected arithmetic return, based on capital market assumptions produced by your consultant, adjusted for the System's long term price inflation assumption of 2.75%. The net return after administrative expenses is 7.34%.

Investment Consultant	Investment Consultant Expected Nominal Return	Investment Consultant Inflation Assumption	Expected Real Return (2)–(3)	Actuary Inflation Assumption	Expected Nominal Return (4)+(5)	Plan Incurred Administrative Expenses	Expected Nominal Return Net of Expenses (6)-(7)		Standard Deviation of Expected Return (1-Year)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)		(9)
1	5.48%	2.12%	3.35%	2.75%	6.10%	0.25%	5.85%		10.40%
2	6.54%	2.50%	4.04%	2.75%	6.79%	0.25%	6.54%		11.50%
3	6.76%	2.50%	4.26%	2.75%	7.01%	0.25%	6.76%		11.40%
4	6.62%	2.25%	4.37%	2.75%	7.12%	0.25%	6.87%		11.80%
5	6.53%	2.11%	4.42%	2.75%	7.17%	0.25%	6.92%		10.80%
6	6.68%	2.20%	4.48%	2.75%	7.23%	0.25%	6.98%		11.00%
7	6.99%	2.26%	4.73%	2.75%	7.48%	0.25%	7.23%		10.60%
8	7.41%	2.20%	5.21%	2.75%	7.96%	0.25%	7.71%		12.00%
Average	**6.62%**	**2.27%**	**4.36%**	**2.75%**	**7.11%**	**0.25%**	**6.86%**		**11.19%**

As the above table shows, the average expected one-year return (net of expenses) of the eight firms is 6.86%. Most of the investment firms have an expected nominal return above 7.00%.

Investment Consultant	Distribution of 20-Year Average Geometric Net Nominal Return			Probability of Exceeding 7.25% *
	40th	50th	60th	
(1)	(2)	(3)	(4)	(5)
1	4.75%	5.34%	5.92%	20.5%
2	5.27%	5.91%	6.56%	30.1%
3	5.49%	6.13%	6.78%	33.1%
4	5.55%	6.21%	6.88%	34.6%
5	5.77%	6.37%	6.98%	35.7%
6	5.79%	6.40%	7.02%	36.5%
7	6.10%	6.69%	7.29%	40.7%
8	6.36%	7.03%	7.71%	46.7%
Average	**5.64%**	**6.26%**	**6.89%**	**34.7%**

**Alternate 1's return assumption net of expenses.*

The final table above shows a narrow range of 20-year average net nominal returns (geometric).

Current standards define the reasonable range for the return assumption is between the expected geometric return (i.e., 50th percentile) and the expected arithmetic return. We observe that this range is 6.26% to 7.11% using a price inflation assumption of 2.75%.

These capital market assumptions generally apply for the next ten years. Fewer projections exist for longer periods and the use of the projections above for the longer term are conservative. While the System is closed to new hires and therefore is not as much a long-term operation as it once was, we know from System GASB projections that asset levels are projected to be above $400 million 25 years out and not to drop below $100 million until more than 40 years from now.

SUMMARY OF VALUATION RESULTS

COMPUTED CITY CONTRIBUTION RATES
AS OF JUNE 30, 2014
COMPARISON OF PRESENT AND ALTERNATE ASSUMPTIONS

	June 30, 2014 Valuation	Proposed Demographic Assumptions and Indicated Economic Assumptions		
Economic Assumptions	**Current**	**Current**	**Alternate 1**	**Alternate 2**
Investment Return	7.50%	7.50%	7.25%	6.50%
Wage Inflation	3.50%	3.50%	3.50%	3.50%
Demographic Assumptions	Current	New	New	New
Contributions for	**% of Active Payroll**			
Total Normal Cost	15.67%	14.71%	15.52%	18.33%
Member Contributions	7.90%	7.90%	7.90%	7.90%
Employer Normal Cost	7.77%	6.81%	7.62%	10.43%
Unfunded Actuarial Accrued Liabilities *	16.61%	20.74%	23.06%	30.07%
COMPUTED EMPLOYER RATE	**24.38%**	**27.55%**	**30.68%**	**40.50%**
Funded Ratio	83.6%	80.7%	78.6%	72.6%

** Amortized as a level dollar amount over a period of 24 years.*
 # Weighted average of member contribution rates.

ACTUAL AND EXPECTED DEMOGRAPHIC EXPERIENCE FOR THE OBSERVATION PERIOD

DESCRIPTION OF THE STUDY

Annual actuarial valuations are completed each year as of June 30. An important ingredient for the valuation is the census of current active members and benefit recipients. Key items of interest include:

Status
Date of birth
Gender
Date of departure (from active status)
Reason for departure
Credited service
Annual pay

Six years of active member and retiree data submissions were used for the experience study. From this data we determined which members left active service each year and the reason they left service (retirement, withdrawal, disability, etc.). The reported data is of sufficient quality and is adequate for this purpose.

The tables and charts in this report refer to the "rate" of employment termination due to some cause. As an example, consider 100 members age 55 and eligible for normal retirement. If 30 of the members actually retire, the "rate of retirement" is .30 (30 divided by 100).

"Exposure" means the number of members who can potentially terminate membership within a given year, due to a particular cause. For example, for retirement, the exposure is the number of members eligible to retire in a given year.

When actual experience is different from projected experience, we propose new actuarial assumptions which are generally between the present assumptions and the actual experience. This is a generally accepted method of making periodic adjustments to long-term actuarial assumptions.

AGE BASED WITHDRAWAL EXPERIENCE 2009 – 2014: MALE

Age	Withdrawals	Exposure	Crude Rates	Sample Rates		Expected Withdrawals	
				Old	New	Old	New
Under 20	-	-	N/A	0.0299	0.0353	-	-
20-24	-	-	N/A	0.0296	0.0350	-	-
25-29	1	16	0.0625	0.0287	0.0339	-	1
30-34	2	123	0.0163	0.0272	0.0321	3	4
35-39	5	178	0.0281	0.0248	0.0293	4	5
40-44	4	280	0.0143	0.0217	0.0257	6	7
45-49	12	320	0.0375	0.0176	0.0208	6	7
50-54	7	474	0.0148	0.0102	0.0121	5	6
55-59	6	400	0.0150	0.0026	0.0031	1	1
60-64	2	132	0.0152	0.0001	0.0001	-	-
65-69	-	-	N/A	0.0000	0.0000	-	-
70-74	-	-	N/A	0.0000	0.0000	-	-
75 and over	-	-	N/A	0.0000	0.0000	-	-
Totals	39	1,923	0.0203	0.0130	0.0161	25	31
Ref				5	5		
Prior Experience							
2004-2009	33	2,330	0.0142			32	32
1999-2004	43	2,533	0.0170			51	40
1994-1999	40	1,725	0.0232			69	49

The number of withdrawals were higher than expected over the observation period for males. We recommend increasing the probabilities of withdrawal consistent with the new sample rates shown above.

AGE BASED WITHDRAWAL EXPERIENCE 2009 - 2014: FEMALE

Age	Withdrawals	Exposure	Crude Rates	Sample Rates		Expected Withdrawals	
				Old	New	Old	New
Under 20	-	-	N/A	0.0595	0.0794	-	-
20-24	-	-	N/A	0.0589	0.0786	-	-
25-29	1	17	0.0588	0.0569	0.0759	1	1
30-34	7	55	0.1273	0.0516	0.0688	3	4
35-39	12	159	0.0755	0.0437	0.0583	6	9
40-44	15	218	0.0688	0.0352	0.0469	7	10
45-49	6	259	0.0232	0.0260	0.0347	6	9
50-54	9	291	0.0309	0.0141	0.0188	4	6
55-59	1	284	0.0035	0.0035	0.0047	1	1
60-64	1	105	0.0095	0.0001	0.0001	-	-
65-69	-	-	N/A	0.0000	0.0000	-	-
70-74	-	-	N/A	0.0000	0.0000	-	-
75 and over	-	-	N/A	0.0000	0.0000	-	-
Totals	52	1,388	0.0375	0.0202	0.0288	28	40
Ref				6	6		
Prior Experience							
2004-2009	46	1,730	0.0266			31	41
1999-2004	43	2,533	0.0170			51	40
1994-1999	40	1,725	0.0232			69	49

The number of withdrawals were higher than expected over the observation period for females. We recommend increasing the probabilities of withdrawal consistent with the new sample rates shown above.

SERVICE-BASED WITHDRAWAL EXPERIENCE 2009 – 2014: MALE AND FEMALE

Service Index	Withdrawals	Exposure	Crude Rates	Sample Rates		Expected Withdrawals	
				Old	New	Old	New
1	14	71	0.1972	0.1000	0.1500	7	11
2	15	167	0.0898	0.0700	0.0800	11	13
3	17	187	0.0909	0.0600	0.0700	11	13
4	11	188	0.0585	0.0500	0.0600	9	11
5	7	174	0.0402	0.0500	0.0500	8	8
Totals	64	787	0.0813	0.0584	0.0712	46	56
Ref				103	133		
				Prior Experience			
	2004-2009	56	873	0.0641		43	55
	1999-2004	73	1,775	0.0411		93	86
	1994-1999	41	1,400	0.0293		131	84

The number of withdrawals with less than 5 years of service was higher than expected over the experience period. We recommend increasing the probabilities of service based withdrawals to the new rates shown above.

Age	Retirements	Exposure	Crude Rates	Sample Rates		Expected Retirements	
				Old	New	Old	New
49	1	1	1.0000	N/A	N/A	-	-
50	4	4	1.0000	0.3500	0.4000	1	2
51	6	7	0.8571	0.3500	0.4000	2	3
52	11	11	1.0000	0.3500	0.4000	3	4
53	7	7	1.0000	0.3500	0.4000	2	3
54	12	14	0.8571	0.3500	0.4000	4	6
55	14	14	1.0000	0.3500	0.4000	4	5
56	7	11	0.6364	0.3500	0.4000	3	4
57	9	9	1.0000	0.3500	0.4000	3	4
58	5	12	0.4167	0.3500	0.4000	4	5
59	6	6	1.0000	0.3500	0.4000	2	2
60	3	8	0.3750	0.3500	0.4000	3	3
61	4	5	0.8000	0.3500	0.4000	2	2
62	57	102	0.5588	0.3500	0.4000	36	41
63	14	47	0.2979	0.3500	0.4000	15	19
64	15	37	0.4054	0.3500	0.4000	11	15
65	5	18	0.2778	0.5000	0.5000	8	9
66	8	15	0.5333	0.6000	0.6000	8	9
67	2	7	0.2857	0.7000	0.7000	5	5
68	2	6	0.3333	0.8000	0.8000	3	5
69	1	5	0.2000	0.9000	0.9000	4	5
70	1	5	0.2000	1.0000	1.0000	4	5
71	-	4	0.0000	1.0000	1.0000	3	4
72	1	4	0.2500	1.0000	1.0000	4	4
73	1	3	0.3333	1.0000	1.0000	3	3
74	-	3	0.0000	1.0000	1.0000	2	3
Totals	196	365	0.5370			140	170
75 & Over	1	4	0.2500			4	4
Total	197	369	0.5339			144	174
Prior Experience							
2004-2009	209	412	0.5073			113	166
1999-2004	190	334	0.5689			98	98
1994-1999	169	601	0.2814			201	170

The number of retirements was more than expected over the experience period. We recommend an increase in probabilities of retirement.

There were an additional 32 retirements observed during the experience period due to early retirement. This was about 3.0% of the exposure. Therefore, we are also recommending an early retirement assumption of 3% for all years.

DISABILITY EXPERIENCE 2009 - 2014

Age	Disabilities	Exposure	Crude Rates	Sample Rates		Expected Disabilities	
				Old	New	Old	New
Under 20	-	-	N/A	0.0001	0.0001	-	-
20-24	-	-	N/A	0.0001	0.0001	-	-
25-29	-	33	0.0000	0.0001	0.0001	-	-
30-34	-	178	0.0000	0.0002	0.0002	-	-
35-39	1	337	0.0030	0.0005	0.0005	-	-
40-44	-	498	0.0000	0.0011	0.0011	-	-
45-49	-	579	0.0000	0.0022	0.0022	1	1
50-54	-	765	0.0000	0.0037	0.0037	2	2
55-59	4	684	0.0058	0.0052	0.0052	3	3
60-64	2	125	0.0160	0.0000	0.0000	1	1
65-69	-	-	N/A	0.0000	0.0000	-	-
70-74	-	-	N/A	0.0000	0.0000	-	-
75 and over	-	-	N/A	0.0000	0.0000	-	-
Totals	7	3,199	0.0022	0.0022	0.0022	7	7
Ref				38	38		
Prior Experience							
2004-2009	8	3,978	0.0020			5	7
1999-2004	9	6,607	0.0014			10	10
1994-1999	4	5,657	0.0007			14	8

Disability experience was as expected over the experience period. We recommend no change in disability rates.

PAY INCREASE EXPERIENCE 2009 - 2014

Age Based

Age Group Beginning of Year	Number	Merit/Seniority % Increase			Total % Increase		
		Actual	Present	Proposed	Actual	Present	Proposed
Under 25	19	6.10%	8.83%	8.83%	6.85%	9.58%	9.58%
25-29	152	5.80%	6.88%	6.88%	6.55%	7.63%	7.63%
30-34	292	3.61%	5.59%	5.59%	4.36%	6.34%	6.34%
35-39	450	2.14%	4.84%	4.84%	2.89%	5.59%	5.59%
40-44	572	1.58%	4.26%	4.26%	2.33%	5.01%	5.01%
45-49	690	1.53%	3.82%	3.82%	2.28%	4.57%	4.57%
50-54	832	0.70%	3.34%	3.34%	1.45%	4.09%	4.09%
55-59	708	0.96%	3.14%	3.14%	1.71%	3.89%	3.89%
60-64	301	0.37%	2.87%	2.87%	1.12%	3.62%	3.62%
65 & Over	45	0.00%	2.88%	2.88%	0.75%	3.63%	3.63%
Total	**4,061**						

Changes in overall pay inflation, in the Country as a whole, were lower than the wage inflation assumption of 3.5%. If our wage inflation assumption was realized, actual increases would have closely matched the expected increases. We recommend no change in the merit and longevity pay assumption.

EXPANDED LISTING OF RECOMMENDED ASSUMPTIONS

PROPOSED PRE-RETIREMENT MORTALITY RATES

	% Dying Next Year	
Age	Male	Female
20	0.0359%	0.0144%
21	0.0400%	0.0145%
22	0.0437%	0.0146%
23	0.0459%	0.0151%
24	0.0467%	0.0154%
25	0.0440%	0.0159%
26	0.0421%	0.0166%
27	0.0411%	0.0175%
28	0.0407%	0.0185%
29	0.0410%	0.0195%
30	0.0417%	0.0208%
31	0.0428%	0.0222%
32	0.0442%	0.0236%
33	0.0458%	0.0250%
34	0.0475%	0.0264%
35	0.0491%	0.0277%
36	0.0503%	0.0289%
37	0.0515%	0.0305%
38	0.0531%	0.0322%
39	0.0550%	0.0344%
40	0.0577%	0.0370%
41	0.0615%	0.0402%
42	0.0662%	0.0441%
43	0.0722%	0.0487%
44	0.0795%	0.0541%
45	0.0881%	0.0602%
46	0.0982%	0.0672%
47	0.1096%	0.0748%
48	0.1224%	0.0834%
49	0.1366%	0.0927%
50	0.1521%	0.1028%
51	0.1691%	0.1133%
52	0.1876%	0.1244%
53	0.2088%	0.1360%
54	0.2327%	0.1479%
55	0.2590%	0.1603%
56	0.2884%	0.1732%
57	0.3212%	0.1865%
58	0.3579%	0.2005%
59	0.3992%	0.2153%
60	0.4456%	0.2314%
61	0.4982%	0.2490%
62	0.5576%	0.2683%
63	0.6247%	0.2901%
64	0.7001%	0.3143%
65	0.7846%	0.3412%
Ref	#1158sb0x1	#1159sb0x1

PROPOSED POST-RETIREMENT MORTALITY RATES

Age	% Dying Next Year	
	Male	Female
50	0.3667%	0.2582%
51	0.3961%	0.2730%
52	0.4263%	0.2892%
53	0.4600%	0.3069%
54	0.4957%	0.3261%
55	0.5328%	0.3471%
56	0.5713%	0.3701%
57	0.6107%	0.3957%
58	0.6513%	0.4241%
59	0.6937%	0.4560%
60	0.7387%	0.4918%
61	0.7876%	0.5320%
62	0.8415%	0.5768%
63	0.9016%	0.6265%
64	0.9689%	0.6818%
65	1.0439%	0.7430%
66	1.1271%	0.8113%
67	1.2191%	0.8871%
68	1.3209%	0.9714%
69	1.4337%	1.0654%
70	1.5588%	1.1702%
71	1.6980%	1.2868%
72	1.8537%	1.4173%
73	2.0284%	1.5622%
74	2.2242%	1.7243%
75	2.4452%	1.9042%
76	2.6941%	2.1044%
77	2.9756%	2.3283%
78	3.2938%	2.5795%
79	3.6533%	2.8608%
80	4.0602%	3.1777%

Age	% Dying Next Year	
	Male	Female
81	4.5208%	3.5354%
82	5.0411%	3.9399%
83	5.6291%	4.3972%
84	6.2933%	4.9140%
85	7.0416%	5.4976%
86	7.8853%	6.1562%
87	8.8333%	6.8996%
88	9.8971%	7.7371%
89	11.0893%	8.6831%
90	12.4247%	9.7407%
91	13.8620%	10.8991%
92	15.3713%	12.1453%
93	16.9426%	13.4798%
94	18.5682%	14.8957%
95	20.2507%	16.3956%
96	22.0009%	18.0191%
97	23.8131%	19.7317%
98	25.6936%	21.5323%
99	27.6495%	23.4100%
100	29.6553%	25.3600%
101	31.6983%	27.3713%
102	33.7492%	29.4210%
103	35.7754%	31.4932%
104	37.7824%	33.5646%
105	39.7420%	35.6322%
106	41.6449%	37.6737%
107	43.4853%	39.6709%
108	45.2410%	41.6140%
109	46.9190%	43.4922%
110	100.0000%	100.0000%
Ref	#1208sb0x1	#1209sb0x1

PROPOSED POST-RETIREMENT DISABLED MORTALITY RATES

Age	% Dying Next Year	
	Male	Female
50	1.8403%	1.1109%
51	1.8989%	1.1698%
52	1.9575%	1.2279%
53	2.0263%	1.2840%
54	2.0985%	1.3372%
55	2.1710%	1.3875%
56	2.2436%	1.4350%
57	2.3151%	1.4798%
58	2.3856%	1.5230%
59	2.4565%	1.5661%
60	2.5290%	1.6106%
61	2.6062%	1.6587%
62	2.6908%	1.7121%
63	2.7843%	1.7733%
64	2.8883%	1.8438%
65	3.0035%	1.9259%
66	3.1292%	2.0211%
67	3.2654%	2.1309%
68	3.4137%	2.2566%
69	3.5747%	2.4009%
70	3.7504%	2.5647%
71	3.9434%	2.7496%
72	4.1572%	2.9583%
73	4.3943%	3.1904%
74	4.6564%	3.4493%
75	4.9483%	3.7329%
76	5.2715%	4.0429%
77	5.6308%	4.3805%
78	6.0287%	4.7471%
79	6.4686%	5.1415%
80	6.9558%	5.5663%

Age	% Dying Next Year	
	Male	Female
81	7.4957%	6.0233%
82	8.0925%	6.5145%
83	8.7534%	7.0418%
84	9.4855%	7.6078%
85	10.2950%	8.2158%
86	11.1926%	8.8704%
87	12.1843%	9.5772%
88	13.2790%	10.3406%
89	14.4860%	11.1706%
90	15.8161%	12.0617%
91	17.1729%	13.0541%
92	18.5551%	14.1394%
93	19.9709%	15.3203%
94	21.4189%	16.5869%
95	22.9015%	17.9383%
96	24.4263%	19.4122%
97	25.9807%	20.9659%
98	27.5684%	22.5952%
99	29.1994%	24.2889%
100	30.8576%	26.0464%
101	32.5525%	27.8657%
102	34.2926%	29.7398%
103	36.0618%	31.6634%
104	37.8825%	33.6249%
105	39.7420%	35.6322%
106	41.6449%	37.6737%
107	43.4853%	39.6709%
108	45.2410%	41.6140%
109	46.9190%	43.4922%
110	48.5103%	45.3054%
Ref	#1258sb0x1	#1259sb0x1

PROPOSED WITHDRAWAL RATES

Less than 10 Years of Service		
Service Index	Male	Female
1	0.1000	0.1500
2	0.0700	0.0800
3	0.0600	0.0700
4	0.0500	0.0600
5	0.0500	0.0500
6	0.0000	0.0000
7	0.0000	0.0000
8	0.0000	0.0000
9	0.0000	0.0000
10	0.0000	0.0000
Sw	103	133

10 or more Years of Service		
Age	Male	Female
25	0.0529	0.0772
26	0.0526	0.0767
27	0.0522	0.0759
28	0.0517	0.0749
29	0.0512	0.0737
30	0.0507	0.0722
31	0.0501	0.0706
32	0.0494	0.0688
33	0.0487	0.0669
34	0.0479	0.0649
35	0.0470	0.0628
36	0.0461	0.0606
37	0.0451	0.0583
38	0.0441	0.0561
39	0.0430	0.0538
40	0.0419	0.0515
41	0.0407	0.0492
42	0.0395	0.0469
43	0.0382	0.0445
44	0.0368	0.0422
45	0.0354	0.0398
46	0.0338	0.0373
47	0.0320	0.0347
48	0.0299	0.0319
49	0.0275	0.0288
50	0.0248	0.0256
51	0.0218	0.0223
52	0.0186	0.0188
53	0.0154	0.0155
54	0.0123	0.0123
Wx	5	6
Wx Mult	65%	100%

PROPOSED NORMAL RETIREMENT RATES

Age	% Retiring	
	Male	Female
45		
46		
47		
48		
49		
50	40%	40%
51	40%	40%
52	40%	40%
53	40%	40%
54	40%	40%
55	40%	40%
56	40%	40%
57	40%	40%
58	40%	40%
59	40%	40%
60	40%	40%
61	40%	40%
62	40%	40%
63	40%	40%
64	40%	40%
65	50%	50%
66	60%	60%
67	70%	70%
68	80%	80%
69	90%	90%
70	100%	100%
71	100%	100%
72	100%	100%
73	100%	100%
74	100%	100%
75	100%	100%
76	100%	100%
77	100%	100%
78	100%	100%
79	100%	100%
80	100%	100%
Rx	72	72
anchor	50	50

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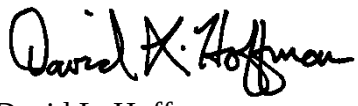
October 8, 2015

Ms. Peggy Korzen
Executive Director
City of Grand Rapids General Retirement System
233 East Fulton, Suite 216
Grand Rapids, Michigan 49503

Dear Peggy:

Enclosed are 20 copies of the report of an experience study covering the period from July 1, 2009 through June 30, 2014.

Sincerely,



David L. Hoffman

DLH/mrb

Enclosures